

## ROTHERFIELD PARK, NORTH HAMPSHIRE: AN IMPORTANT SITE FOR SAPROXYLIC COLEOPTERA, DIPTERA AND OTHER INSECTS

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### ABSTRACT

The insect fauna of Rotherfield Park, North Hampshire was sampled in 2002. A rich coleopteran and dipteran fauna was identified, with several new Vice-county records. The saproxylic beetle fauna was used to calculate site quality indices, which were compared with other sites in north-east Hampshire, and show the Park to be of considerable local importance. The richest Dipteran fauna was associated with the more closed woodland habitats rather than around the open parkland trees. In contrast, most of the more important coleopteran records were made on standards in the open parkland.

### INTRODUCTION

Rotherfield Park lies between Alton and Petersfield in North Hampshire (VC12). It is one of the most complete examples of early 19th Century Picturesque, the house and landscape being of immense historic and cultural interest (Hussey, 1967). The complex of parkland and woodland also provides important habitats for wildlife, and our surveys in 2002 revealed an important invertebrate assemblage.

The Park was first mentioned in 1564 (Coates, 1989) and in its current form covers approximately 200 hectares of rolling terrain on chalk with areas of clay-with-flints, and consists of open pasture land grazed by cattle with scattered mature standards mostly of beech, oak, sycamore and sweet chestnut. There are also scattered small groups of 3–10 mature trees as well as more extensive copses with abundant beech, hawthorn, sloe and yew. The Park encompasses two larger woodland blocks: Plash Wood (SU6932) lies to the north of the house and appears on an estate map of 1635, but is clearly much older, and Stonybrow Wood and Plantation (SU6830) stand along the south-western edge of the estate. Both woods have abundant beech including many fine mature trees, and extensive coppice woodland with abundant hazel.

One of the most striking features of the Park is the avenue of lime *Tilia x vulgaris* L. trees, which run southward from the main house. These were already large trees 200 years ago and these have developed much side growth, forming what can only be described as two giant hedgerows lining the old driveway. The Park falls within SU63 and SU73 10 km squares of the National Grid.

Dead wood, both standing and fallen, is locally abundant across the Park and many large fallen trees have been left *in situ* where they continue to attract invertebrate interest. Large boles of fallen trees have also been placed along the margins of the copses.

The mature parkland trees were the main focus of the saproxylic beetle survey (i.e. those species associated with wood decay and deadwood), whilst the more sheltered wooded areas were targeted for Diptera.

## SITE VISITS AND METHODS

Site visits were made from mid March–late October 2002, when standard field techniques of beating, sweep netting and grubbing were employed to sample the invertebrate fauna. In addition small bottle traps primed with a fermenting ‘sap’ mixture were placed in hollow trees and emptied at weekly intervals during May and June 2002.

The quality of the saproxylic beetle fauna of Rotherfield Park was assessed using two recognized indices, and the result compared with other important sites in North and East Hampshire.

### Index of Ecological Continuity (IEC)

This method of measuring the quality of the saproxylic Coleoptera fauna was developed by Harding & Alexander (1994), using the scores assigned to 195 species in Harding & Rose (1986), which were divided into three groups ‘according to the extent to which they have been consistently recorded from areas of ancient woodland with a continuity of dead wood habitats’. Grade 1 indicators (those species deemed the most dependent on ancient dead wood habitats) scored 3 points, Grade 2 scored 2 points, and Grade 3 species scored 1 point. Alexander (2004) refined this method using data collected over the past decade or so. This has resulted in some minor modifications to the original list of qualifying species, see Appendix 1.

### Species Quality Index (SQI)

The Species Quality Score (SQS) and Species Quality Index (SQI) are different ways of comparing sites, which are not dependent on cumulative sampling effort. Fowles *et al.* (1999) assigned quality scores to native saproxylic Coleoptera, ranging from 1 for common species to 32 for Red Data Book (RDB) taxa (but the statuses have in many cases been revised from those in Hyman & Parsons (1992)). The SQS is produced by adding together the assigned scores for the species captured: the SQI is then calculated by dividing the SQS by the total number of species and multiplying by 100. This gives a score that can be used for comparative purposes which overcomes the problems of differences in sampling effort, providing at least 50 species are recorded.

## RESULTS

In all, 175 species of Coleoptera were recorded of which 125 (71%) were taxa included in the checklist of invertebrates of living and decaying timber (Alexander, 2002), and of 270 species of Diptera recorded, 80 (30%) were also included in this checklist. The richest dipteran fauna was associated with the more closed woodland habitats rather than around the open parkland trees. In contrast, most of the more important coleopteran records were made on standards in the open parkland. Species of Notable status are listed below:

### Coleoptera

*Scydmaenus rufus* Müller & Kunze (Scydmaenidae) (RDB2). Occurs under bark of hardwoods and pines. This species appears to be increasing, and is not uncommon in North-East Hampshire/Surrey and Berkshire (Denton, 1999).

*Mycetophagus quadriguttatus* Müller (Mycetophagidae) (Notable A in Hyman & Parsons, 1992). A male found under the bark of a dead but standing sycamore on 2.vi.2002 may be the first record for North Hampshire.

*Variimorda villosa* (Schrank) (Nb) (Mordellidae). This species is not uncommon in Surrey and North Hampshire, especially on the chalk. Though formerly included in the IEC (Harding & Rose, 1986), doubt has been cast on whether it is a saproxylic species, but the female captured in the park flew to, and began to probe a large beech stump with her abdomen, on the 28.v.2002.

*Anthrribus nebulosus* Forster (Anthribidae) (Nb). This species is often found on large oak trees in old parkland. It was beaten from a large oak on 2.vi.2002.

*Cionus nigritarsis* Reitter (Curculionidae) (Na). Abundant on Dark Mullein *Verbascum nigrum* L. The chalk of North Hampshire and Wiltshire is a stronghold nationally for this species.

*Taphrorychus bicolor* (Herbst) (Na). Found in beech bark near Plash Wood on 28.v.2002. This may be the first record for North Hampshire.

## Diptera

*Atypophthalmus inustus* (Meigen) (Limoniidae). Notable according to Falk (1991). This is a local species that develops in wood-encrusting fungi and is usually found in low numbers, mostly in ancient woodland sites.

*Ditomyia fasciata* (Meigen) (Ditomyiidae) (N). Associated with a wide range of hard polypore wood-decaying fungi in old woodlands mainly beech. Widespread in Southern England.

*Exechiopsis membranacea* (Lundström) (Mycetophilidae) (N). A local species of woodland and carr in southern England, 11 sites listed in Falk & Chandler (in prep.) including the New Forest and Leckford in Hampshire. Biology unrecorded but probably develops in gill fungi.

*Mycetophila hetschkoi* Landrock (Mycetophilidae) (N). This is a local fly found mostly in damp woodland, throughout Britain but mostly in the north and west, although recorded from Hampshire. It develops in soft terrestrial fungi such as *Hydnum* and *Ramaria*.

*Trichonta clavigera* Lundström (Mycetophilidae) (N). Previous Hampshire records include several sites in the New Forest and Selborne Hanger. Biology unrecorded but probably in wood encrusting fungi.

*Mycomya occultans* (Winnertz) (Mycetophilidae). Recognized as RDB2 in Falk & Chandler (in prep.) which lists six sites in South Wales and Kent; but has since been recorded at sites in Buckinghamshire, Somerset and Suffolk so is proving more widespread than first thought and further downgrading may be necessary. It develops in bracket fungi such as *Daedalea* and *Piptoporus* growing on broad-leaved trees.

*Diazosma hirtipenne* (Siebke) (Trichoceridae) (N). This species is widespread in Britain as far as northern Scotland, but seems very local, occurring mainly in dry woodland; there are records from Hertfordshire and Berkshire and it was recorded at Lackham, Wiltshire in 2002 (Chandler, 2003). It has been found around dead wood but also reared once from a bird's nest. This is the first record for Hampshire.

*Systemus tener* Loew (Dolichopodidae). RDB3 in Falk (1991), but considered insufficiently known by Falk & Crossley (in prep.), with old records from the New Forest and Herefordshire and recent records from Kent. Members of this genus develop in tree rot holes and are most often recorded by rearing, so it is considered that they are significantly under-recorded by general collecting methods.

*Paraplatypeza bicincta* (Szilády) (Platypezidae). This species was only added to the British list in 2002 (Chandler, 2002a) from a single female found at West End Common, Esher, Surrey in 2001. A further female was found at Waggoner's Wells, Hants on the same day as the find at Stonybrow Wood (Chandler, 2002b). The biology is unknown but the allied species *P. atra* (Meigen) develops in gill fungi, mainly the lignicolous species *Pluteus cervinus*. As *P. bicincta* is evidently widespread it is curious that it has not been recorded previously, but it is scarce throughout its European range, which includes Holland and Denmark.

*Sapromyza albiceps* Fallén (Lauxaniidae). Downgraded from RDB3 (Shirt, 1987) to Notable in Falk 1991 and in Falk & Ismay (in prep.), which refers to 20 post-1960 sites. This is a local but widespread species throughout Britain. Adults are usually swept from tree foliage, though the biology of this species is unrecorded; this family mainly develop in decaying vegetation.

*Megamerina dolium* (Fabricius) (Megamerinidae) (N). A single male was found in a rotting hollow of a large beech tree in Stonybrow Wood on 3.vii.2002. This species develops under the bark of hardwoods where the larvae are predatory (Alexander, 2002).

*Parachuscia tigrina* (Fallén) (Clusiidae) (RDB2). Associated with decaying timber, including beech and lime. This species is proving to be widespread in southern England, but the authors are not aware of any other North Hampshire records.

*Gymnosoma rotundatum* (L.) (Tachinidae) (RDB3). This record constitutes the most south-westerly for the species in Britain (Chris Raper, *pers. comm.*). This fly is quite frequent within a very limited area of the South of England, centred on Surrey and adjacent counties, where it is thought to parasitize shieldbugs including *Palomena prasina* (L.) (Hem: Pentatomidae).

Other locally important records included:

#### Hemiptera

*Pediopsis tiliae* (Germar) (Cicadellidae) (Notable B). A leafhopper associated with lime trees, abundant in the lime avenue during June and July. This is probably the first record for North Hampshire (VC12).

#### Lepidoptera

*Chrysoclista lineella* (Clerck) (Cosmopterigidae). A beautiful micro-moth which develops in the bark of lime trees; adults were swept from the lime avenue on the 31.vii.2002. The only previous record in North Hampshire is from Northington (Goater & Norriss, 2001).

#### Hymenoptera

*Lasius brunneus* (Latreille) (Formicidae) (Na). Found on two large oaks in the open park. Rotherfield Park occurs at the most south-western edge of the known range of this very localised arboreal ant in the UK.

*Vespa crabro* L. (Vespidae) (local). The hornet is surprisingly scarce in Surrey and North Hampshire, which both have huge areas of suitable-looking habitat. In recent years there are signs that it is spreading in both counties, and this is the first time JD has encountered the species in the Alton area, though he has also recorded it in recent years at Bartley Heath near Hook.

#### COMPARISON OF SAPROXYLIC BEETLE FAUNAS

The beetle assemblage identified in 2002 had an Index of Ecological Continuity (IEC) of 27, comprising one Grade 2, and twenty-five Grade 3 indicators. This score is quite impressive for just one year's field-work at a site with few veteran oaks.

Table 1. Important sites for saproxylic Coleoptera in North and East Hampshire

|                         | No. of species | IEC | SQS | SQI |
|-------------------------|----------------|-----|-----|-----|
| Harewood Forest         | 102            | 42  | 430 | 422 |
| Bramshott Common/Chase  | 140            | 39  | 524 | 374 |
| Rotherfield Park        | 120            | 27  | 404 | 337 |
| Woolmer Forest          | 100            | 22  | 330 | 330 |
| Henwood/Chappetts Copse | 88             | 20  | 260 | 311 |
| Micheldever Spoil Heaps | 57             | 13  | 160 | 280 |
| Odiham Common           | 95             | 17  | 263 | 277 |
| Binswood                | 80             | 17  | 212 | 265 |

The 120 saproxylic Coleoptera which made up the Species Quality Score (SQS) are shown in appendix 1. These produced a SQS total of 404, which gives a SQI of 337. Within the East Hampshire District this site is clearly one of the richest for dead wood beetles, and is only surpassed by Bramshott Common and Chase (table 1).

Few scores have been generated for sites further afield in North Hampshire, except from JD's data, and for Harewood Forest (see Fowles *et al.*, 1999; Martin Townsend, pers. comm.), so at present it is difficult to assess the site's importance. However, the beetle fauna in the Park is likely to be very representative of the typical saproxylic fauna of old wooded habitats on the chalk in North-East Hampshire, with species associated primarily with beech well represented.

#### DISCUSSION AND CONCLUSIONS

The parkland and associated woodland of Rotherfield Park supports a varied and rich invertebrate fauna associated with dead wood habitats. New county records of Nationally Scarce Diptera and Coleoptera confirm the Park's importance as a regionally significant site for saproxylic beetles and flies. Other Nationally Scarce arboreal insects such as the leafhopper *P. tiliae* and the fungus weevil *A. nebulosus* appear to favour large parkland trees.

Important finds from other groups indicate that the woodland edges and rough grassland habitats across the Park also support some important insects such as *G. rotundatum* and *C. nigritarsis*, and PC made one of the first British records of the moth fly *Saraiella consigliana* (Sara) (Withers, 2004). Further records include three very local staphylinid beetles *Atheta hybrida* (Sharp), *Quedius invreae* Gridelli (Denton, 1998) and *Stenus fuscicornis* Erichson, made in 1997.

The Park is a working estate, which is managed sympathetically for wildlife, and the continued survival of such a rich invertebrate assemblage within an important historic landscape remains a challenge, requiring a long-term perspective. It is significant that mature native trees set in open parkland prove especially attractive to many rare beetle species, which are absent or rare in closed woodland. The maintenance of old parklands is pivotal for the survival of many of our rarer species, and provides an opportunity to marry the cultural and ecological disciplines for the benefit of both.

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#### APPENDIX 1.

##### SAPROXYLIC COLEOPTERA USED TO CALCULATE SPECIES QUALITY SCORE AND INDEX OF ECOLOGICAL CONTINUITY (IEC) AT ROTHERFIELD PARK

**Histeridae:** *Abraeus globosus* (Hoffmann), *Paromalus flavicornis* (Herbst). **Ptilidae:** *Ptinella aptera* (Guerin-Meneville). **Leiodidae:** *Anisotoma humeralis* (Fab.). **Scydmaenidae:** *Scydmaenus rufus* Müller & Kunze. **Staphylinidae:** *Dropephylla ioptera*

(Stephens), *Dropephylla vilis* (Erichson), *Phloeonomus punctipennis* Thomson, *Hapalarea pygmaea* (Paykull), *Phloeocharis subtilissima* Mannerheim, *Atrecus affinis* (Paykull), *Gabrius splendidulus* (Gravenhorst), *Sepedophilus bipunctatus* (Gravenhorst), *Gyrophaena minima* Erichson, *Gyrophaena latissima* (Stephens), *Siagonum quadricorne* Kirby, *Homolota plana* (Gyllenhal), *Anomognathus cuspidatus* (Erichson), *Leptusa fumida* Kraatz, *Leptusa ruficollis* (Erichson), *Bolitochara lucida* (Gravenhorst), *Atheta liturata* (Stephens), *Dinaraea aequata* (Erichson), *Phloeopora testacea* (Mannerheim), *Scaphisoma argaricum* (L.), *Scaphidium quadrimaculatum* Olivier. **Lucanidae:** *Dorcus parallelipedus* (L.), *Sinodendron cylindricum* (L.). **Scirtidae:** *Prionocyphon serricornis* (Müller). **Buprestidae:** *Agrilus sinuatus* (Olivier). **Elateridae:** *Denticollis linearis* (L.), *Stenagostus rhombeus* (Olivier), *Melanotus villosus* (Fourcroy). **Cantharidae:** *Malthinus flaveolus* (Herbst), *Malthinus frontalis* (Marsham), *Malthinus seriepunctatus* Kiesenwetter, *Malthodes marginatus* (Latreille), *Malthodes minimus* (L.). **Lycidae:** *Platycis minuta* (Fab.). **Dermestidae:** *Ctesias serra* (Fab.). **Anobiidae:** *Ptinomorphus imperialis* (L.), *Xestobium rufovillosum* (De Geer), *Hemicoelus fulvicornis* (Sturm), *Anobium inexpectatum* Lohse, *Grynobius planus* (Fab.), *Ptilinus pectinicornis* (L.). **Melyridae:** *Dasytes aeratus* Stephens, *Malachius bipustulatus* (L.). **Cleridae:** *Tillus elongatus* (L.). **Nitidulidae:** *Epuraea marsueli* Reitter, *Epuraea silacea* (Herbst), *Glischrochilus quadriguttatus* (Fab.). **Laemophloidae:** *Cryptolestes ferrugineus* (Stephens). **Rhizophagidae:** *Rhizophagus bipustulatus* (Fab.), *Rhizophagus dispar* (Paykull), *Rhizophagus ferrugineus* (Paykull). **Sphindidae:** *Aspidiphorus orbiculatus* (Gyllenhal). **Cucujidae:** *Pediacus dermestoides* (Fab.). **Silvanidae:** *Silvanus unidentatus* (Olivier). **Cryptophagidae:** *Cryptophagus dentatus* (Herbst), *Cryptophagus ruficornis* Stephens. **Biphyllidae:** *Diplocoelus fagi* Guerin-Meneville, *Biphyllus lunatus* (Fab.). **Erotylidae:** *Dacne bipustulata* (Thunberg), *Triplax aenea* (Schaller). **Cerylonidae:** *Cerylon ferrugineum* Stephens, *Cerylon histeroides* (Fab.). **Endomychidae:** *Endomychus coccineus* (L.). **Latridiidae:** *Enicmus brevicornis* (Mannerheim). **Ciidae:** *Octotemnus glabriculus* (Gyllenhal), *Cis boleti* (Scopoli), *Cis micans* (Fab.), *Cis nitidus* (Fab.), *Cis pygmaeus* (Marsham), *Ennearthron cornutum* (Gyllenhal). **Mycetophagidae:** *Litargus connexus* (Fourcroy), *Mycetophagus quadriguttatus* Müller, *Mycetophagus quadripustulata* (L.). **Colydiidae:** *Synchita humeralis* (Fab.), *Bitoma crenata* (Fab.). **Tenebrionidae:** *Eledona agricola* (Herbst). **Tetratomatidae:** *Tetratoma fungorum* Fab. **Salpingidae:** *Lissodema quadripustulata* (Marsham), *Vincenzellus ruficollis* (Panzer), *Rhinosimus planirostris* (Fab.). **Pyrochroidae:** *Pyrochroa serraticornis* (Scopoli). **Melandryidae:** *Orchesia minor* Walker, *Orchesia undulata* Kraatz, *Conopalpus testaceus* (Olivier). **Scraptidae:** *Anaspis frontalis* (L.), *Anaspis humeralis* (Fab.), *Anaspis lurida* Stephens, *Anaspis rufilabris* (Gyllenhal). **Mordellidae:** *Mordellochroa abdominalis* (Fab.). **Aderidae:** *Aderus oculus* (Paykull). **Cerambycidae:** *Rhagium mordax* (De Geer), *Grammoptera ruficornis* (Fab.), *Alosterna tabacicolor* (De Geer), *Phymatodes testaceus* (L.), *Leptura maculata* (Poda), *Leptura melanura* (L.), *Clytus arietus* (L.), *Leiopus nebulosus* (L.), *Pogonocheirus hispidus* (L.). **Curculionidae:** *Acalles misellus* Boheman. **Scolytinae:** *Scolytus intricatus* (Ratzeburg), *Scolytus multistriatus* (Marsham), *Scolytus rugulosus* (Müller), *Scolytus scolytus* (Fab.), *Hylesinus crenatus* (Fab.), *Hylesinus varius* (Fab.), *Drycoetinus villosus* (Fab.), *Taphrorychus bicolor* (Herbst), *Trypodendron domesticum* (L.), *Ernoporus fagi* (Fab.), *Xyleborus dispar* (Fab.), *Xyloborus saxeseni* (Ratzeburg). **Platypodidae:** *Platypus cylindrus* (Fab.).